

PROCEEDINGS
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REDESCRIPTIONS OF TWO EXOTIC SPECIES
OF MONOGENETIC TREMATODES AND THE
PROPOSAL OF A NEW FAMILY¹

BY EMMETT W. PRICE
*Jacksonville State College,
Jacksonville, Alabama*

In 1936, Ishii described as *Pseudaxine katsuwonis* and *P. vagans* two species of monogenetic trematodes from the gills of *Katsuwonus vagans* (Lesson) from Japan. The descriptions of these worms were in Japanese, but a study of the illustrations showed certain rather marked differences, particularly in the opisthohaptoral clamp structure, that seemed to make questionable their inclusion in the genus *Pseudaxine* Parona and Perugia, 1890. In the English descriptions of these species by Ishii and Sawada (1938), no emphasis was placed on the haptoral clamp structure which is of major importance in determining family relationships. In order to check this and other points, specimens of *P. katsuwonis* and *P. vagans* were made available through the kindness of the late Prof. Ishii. A study of the specimens showed, as the writer surmised, that the species were not congeneric with *Pseudaxine trachuri* Parona and Perugia. This was evident also to Yamaguti (1943), who proposed the new genus *Allopseudaxine* for *P. katsuwonis*, retaining, however, the closely related *P. vagans* in the genus *Pseudaxine*.

Unnithan (1957), apparently unaware of the papers by Ishii (1936), Ishii and Sawada (1938), and Yamaguti (1943), proposed the genus *Uraxine* for *Uraxine chura* and *U. chura macrova*, which were obtained from the gills of *Euthynnus affinis* (Cantor) at Trivandrum, India. He placed the genus *Uraxine* in his new subfamily Monaxininae of his family Axini-

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dae. In a recent paper, the writer (Price, 1962) pointed out that *Uraxine* Unnithan was a synonym of *Allopseudaxine* Yamaguti and excluded it from the Monaxininae because its characters seemed to relate it to the Gastrocotylidae.

In the course of preparation of a paper on the gastrocotylid Monogenea, and in view of the more or less confused relationships of the helminths in question, it seemed desirable to re-study Ishii's *Pseudaxine katsuwonis* and *P. vagans*. In doing so it became evident that Ishii's and Unnithan's species, while congeneric, could not be included in any of the existing families without expanding the concepts of these taxa to a point where they would be virtually meaningless. Consequently, since the above-mentioned species have both microcotylid and gastrocotylid characters, a new intermediate family, Allopseudaxinidae, is proposed for them.

Allopseudaxinidae, new family

Diagnosis: Body flat, somewhat lanceolate in outline. Prohaptor suckers aseptate, unarmed. Opisthohaptor consisting of a single row of strong clamps arranged along one side of posterior part of body and terminating in a languette bearing two pairs of anchors and probably, in young forms, a pair of marginal hooklets between pairs of anchors. Clamps of modified microcotylid-type; median or looped sclerite broad and imperfectly sclerotized, without accessory sclerites. Genital atrium armed with corona of hooked spines; cirrus delicately sclerotized. Testes numerous, pre-ovarial and post-ovarial. Ovary long and slender, with proximal and distal ends directed posteriad. Genito-intestinal canal well developed. Vagina double, openings dorsolateral. Vitellaria well developed, extending to posterior end of body. Eggs relatively large, with filament at each pole. Parasites of scombroid fishes.

Type genus: *Allopseudaxine* Yamaguti, 1943.

This family, as defined, includes at present only the genus *Allopseudaxine* Yamaguti. The opisthohaptor clamps of the included species are of a modified microcotylid-type in that they lack the accessory sclerites characteristic of the Gastrocotylidae. On the other hand, the presence of gastrocotylid-type anchors and the nature of the genital spines point to relationship with the genus *Gastrocotyle*. The intermediate position of *Allopseudaxine* as regards the families Microcotylidae and Gastrocotylidae is analogous to that of *Tagia* Sproston, which in some respects resembles members of both the Discocotylidae and Diclidophoridae.

Genus *Allopseudaxine* Yamaguti, 1943

Synonyms: *Pseudaxine* Parona and Perugia, 1890, in part; *Uraxine* Unnithan, 1957.

Diagnosis: Characters of family.

Type species: *Allopseudaxine katsuwonis* (Ishii, 1936) Yamaguti, 1943.

Included species: *Allopseudaxine chura* (Unnithan, 1957) n. comb. (syn. *Uraxine chura* Unnithan, 1957); *A. macrova* (Unnithan, 1957) n. comb. (syn. *U. c. macrova* Unnithan, 1957); and *A. vagans* (Ishii, 1936) n. comb. (syn. *Pseudaxine vagans* Ishii, 1936).

In view of some inaccuracies and oversights in the original descriptions of *A. katsuwonis* and *A. vagans*, and the availability of specimens of both, redescrptions of these species are given herein.

Allopseudaxine katsuwonis (Ishii, 1936) Yamaguti, 1943

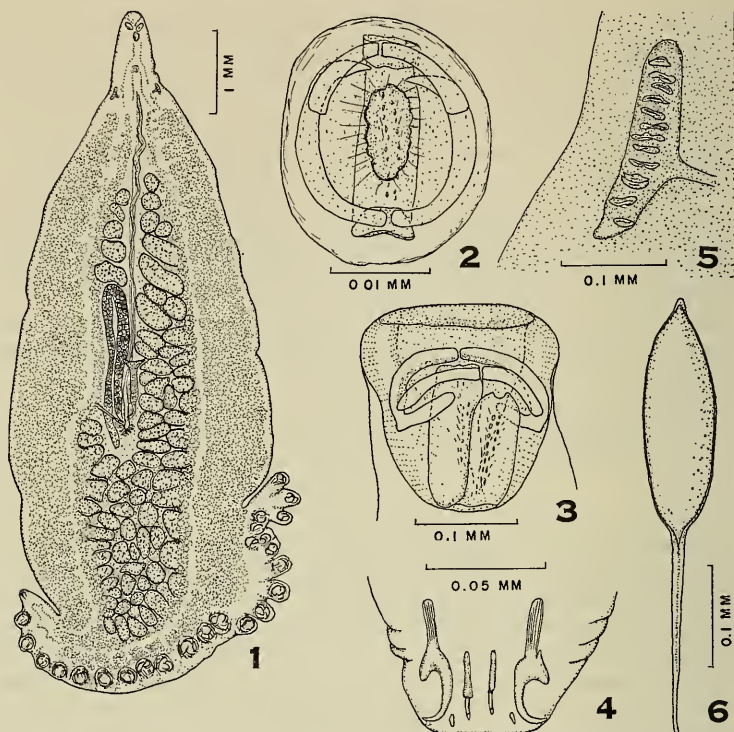
(Figs. 1-6)

Synonym: *Pseudaxine katsuwonis* Ishii, 1936.

Description: Body 8 mm long by 3.2 mm wide at level of anterior limit of opisthohaptor, markedly attenuated cephalic to level of vaginal apertures. Prohaptor suckers about 0.040 by 0.080 mm, aseptate, unarmed. Opisthohaptor frill-like, extending along left side of posterior third of body, bearing single row of 24 pedunculate clamps, and terminating in lobe or languette bearing 2 pairs of anchors and possibly, in young specimens, a pair of larval hooklets located between pairs of anchors. Clamps 0.156 to 0.195 mm wide with framework of modified microcotylid-type; median or looped sclerite spring-like, broad and poorly sclerotized, accessory sclerites absent. Anchors of outer pair 0.050 mm long, those of median pair about 0.027 mm long; larval hooklets not present but their position between anchors of outer and inner pair marked by presence of small, oval ogives (Euzet, 1955). Pharynx oval, 0.090 by 0.060 mm; esophagus simple, bifurcating at or near level of genital aperture; intestinal limbs with short inner and longer lateral diverticula, terminating in distal portion of opisthohaptor region. Genital atrium about 0.1 mm in diameter, about 0.8 mm from anterior end, muscular, armed with corona of about 14 (Ishii gives 12) hook-like spines, their exact number and size obscured by mass of shell material in atrium.

Testes numerous, about 60, occupying interintestinal field from about midway between genital atrium and anterior limit of ovary to near posterior end of body. Vas deferens filled with sperm, extending in median field in an undulating manner to genital atrium.

Ovary slender, in equatorial third of body, with proximal and distal ends directed posteriad. Genito-intestinal canal opening into right intestinal branch at or near level of distal end of ovary. Vitelline reservoir



FIGS. 1-6. *Allopseudaxine katsuwonis*. 1, Complete worm, ventral view; 2, opisthohaptoral clamp, open; 3, clamp, closed; 4, anchors; 5, vaginal atrium; 6, egg.

Y-shaped, extending anteriorly to about level of middle of ovarian length. Vagina double, terminating in elongated atria, opening dorsally through transverse cuticularized slits, and located about 1 mm from anterior end of body. Egg about 0.216 mm long with filament at posterior pole and knob at anterior pole (obviously abnormal; specimen apparently senescent as uterus contained considerable unorganized shell material).

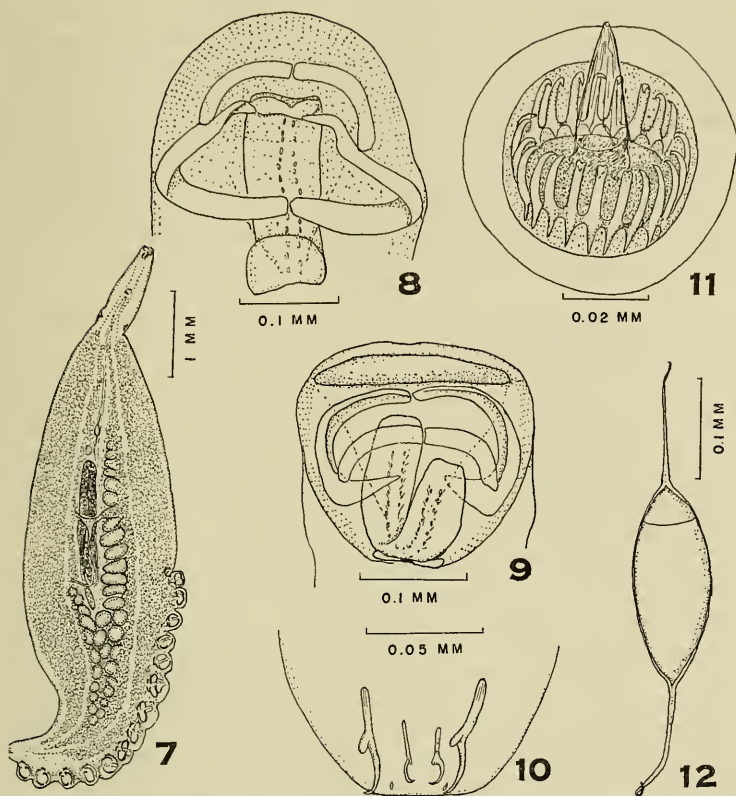
Host: *Katsuwonus vagans* (Lesson).

Location: Gills.

Distribution: Japan.

Specimen: USNM Helm. Coll. No. 37746.

In general, Ishii's and Ishii and Sawada's descriptions of this species are adequate. These authors, however, failed to emphasize one of the most conspicuous characters, namely, the gill-like openings of the vaginal atria which alone would distinguish *A. katsuwonis* from *A. vagans*.



FIGS. 7-12. *Allopseudaxine vagans*. 7, Complete worm, ventral view; 8, clamp, open; 9, clamp, closed; 10, anchors; 11, genital corona; 12, egg.

Allopseudaxine vagans (Ishii, 1936), new combination
(Figs. 7-12)

Synonym: *Pseudaxine vagans* Ishii, 1936.

Description: Body lanceolate, 5 to 7 mm long by 1.8 to 2 mm wide at level of anterior limit of opisthohaptor, markedly attenuated cephalaic to anterior limits of vitellaria. Prohaptor suckers about 0.080 by 0.040 mm. Opisthohaptor similar to that of *A. katsuwonis*, bearing 15 clamps, 0.015 to 0.250 mm wide, and a terminal languette armed with 2 pairs of anchors and probably a pair of laval hooklets in young specimens. Outer anchors 0.050 mm long, inner 0.026 mm; location of larval hooks represented by small ogives situated between and slightly posterior to outer and inner anchors. Pharynx oval, 0.080 by 0.050 mm; esophagus

simple, bifurcating at level of genital atrium; intestinal tract similar to that of *A. katsuwonis*. Genital aperture about 0.460 mm from anterior end; genital atrium about 0.060 mm wide, with thick walls, and provided with corona of 22 gastrocotyloid spines. Cirrus conical, delicately cuticularized, unarmed; testes about 30 or 35, distributed as in *A. katsuwonis*; remainder of genital system similar to that in *A. katsuwonis*. Vaginal apertures dorsal, about 1 mm from anterior end of body, not opening to exterior through multiple transverse slits. Egg oval, 0.200 mm long by 0.080 mm wide, with relatively long filament at each pole.

Host: Katsuwonus vagans (Lesson).

Location: Gills.

Distribution: Japan.

Specimens: USNM Helm. Coll. No 37747 (paratypes).

In Ishii's original description and figure of *Pseudaxine vagans*, the testes were represented as being few and located posterior to the ovary. Actually the testes, while fewer in number, are located as in *A. katsuwonis*. Aside from fewer testes and opisthohaptoral clamps, the most distinguishing character of *A. vagans* is in the absence of the gill-like vaginal slits which are so prominent in *A. katsuwonis*.

In Unnithan's (1957) descriptions of *Uraxine chura* (= *A. chura*) and *U. c. macrova* (= *A. macrova*), obtained from the gills of *Euthynnus affinis* (Cantor)¹, no mention was made of the presence of vaginal slits and in this respect they are closely related to *A. vagans*. As a matter of fact, it is possible that when the extent of variation in clamps and egg sizes, as well as the number of genital spines, is known, Unnithan's species may be found to be identical with *A. vagans*. In any event, these species should be restudied, since Unnithan stated in connection with *U. chura* that "the two lateral vaginal canals starting from the base of the vaginal pores are connected behind the level of the intestinal bifurcation by narrow transverse connections which unite in the middle to form a median longitudinal vaginal canal which opens at the posterior sides of the oötype." This connection with the oötype is shown in his figure 5,f. Unless Unnithan has confused the "vaginal canal" with the vas deferens, which seems probable, this arrangement is unique among the monogeneans.

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¹ Jordan, Evermann, and Clark (1930) list *Thynnus affinis* Cantor (= *Euthynnus affinis* (Cantor)) as a synonym of *Katsuwonus vagans* (Lesson).

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